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(54) Title: DIGITAL TELEVISION SYSTEM WHICH SELECTS IMAGES FOR DISPLAY IN A VIDEO SEQUENCE			
(57) Abstract A digital television system includes a memory which stores a user profile and computer-executable process steps, and a display processor which receives video data and which outputs the video data as a video sequence. A controller receives video data corresponding to at least two alternative images. The controller executes the process steps stored in the memory so as to select one of the alternative images based on information stored in the user profile, and to cause the display processor to include the selected one of the alternative images within the video sequence.			

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Digital television system which selects images for display in a video sequence.

BACKGROUND OF THE INVENTION

Field Of The Invention

The present invention is directed to a digital television system which selects
5 images for display to a user. In particular, the invention is directed to a digital television
system which stores a profile for the user and which selects, based on the stored profile, one of
two or more alternative images for display within a video sequence.

Description Of The Related Art

10 Heretofore, the range of video signal processing options available within a
television has been relatively limited. That is, in conventional television systems, most video
signal processing is performed in the television station, as opposed to in the television itself.
This is particularly true in the case of inserting images, such as graphics, advertisements, etc.,
within a video sequence to be displayed by the television.

15 More specifically, in conventional television systems, images are inserted into a
video sequence at the television station, whereafter the video sequence, including the inserted
images, is transmitted to all televisions within range of the station. With the advent of satellite
broadcasting and cable television, however, inserting images at a single location, such as a
television station, can have disadvantages, particularly with regard to television advertising.
20 For example, television "superstations", such as WGN of Chicago and WPIX of New York,
are available in many cities in the U.S.; however, those stations contain local advertising
which is specific to the city in which the station is located. This advertising is therefore
essentially wasted on all those outside the immediate viewing area. Thus, by inserting
advertising at a single location, such stations are not able to take full economic advantage of
25 the advertising potential of their television programs.

Moreover, as consumer tastes have become more fragmented, inserting
television advertisements at a single location has become less desirable from a marketing
standpoint. That is, many television advertisers now target their advertisements to a very
specific audience or "demographic". However, while it is possible to generalize the likes and

dislikes of a target demographic to a certain extent, there is a limit as to the accuracy of this generalization. As a result, under current systems in which television advertising is inserted at a single location, such advertising may not always be effectively targeted to the consumer.

Thus, there exists a need for a television system which inserts video images, such as television advertisements, within a video sequence, and in which those video images are narrowly tailored to a particular viewer or audience.

SUMMARY OF THE INVENTION

The present invention addresses the foregoing need by providing a digital television system (i.e., a digital television or a digital television in combination with a settop box) which stores a user profile containing information concerning the user, such as the user's sex, age, preferences, location, etc., and which selects one of at least two alternative images for display in a video sequence based on the information stored in the user's profile. For example, in accordance with the invention, the profile may contain information indicating that the user has children under the age of thirteen. Accordingly, in this case, the digital television system may select a toy advertisement, as opposed to an electronics advertisement, for display during a television program.

Thus, according to one aspect, the present invention is a digital television system that includes a memory which stores a user profile and computer-executable process steps. Also included within the digital television system are a display processor which receives video data and which outputs the video data as a video sequence, and a controller which receives video data corresponding to at least two alternative images. In the invention, the controller executes the process steps stored in the memory so as to select one of the alternative images based on information stored in the user profile, and to cause the display processor to include the selected one of the alternative images within the video sequence.

By selecting one of at least two alternative images for display in the video sequence based on the user's profile, the invention is able to tailor the video sequence to the user. For example, the invention is able to provide the user with advertisements, graphics, or the like, which are appropriate for the user. Moreover, the invention is able to synchronize the display of products within a television program with displays of commercials of those products during the television program.

In preferred embodiments of the invention, the information stored in the user profile is based on the user's television viewing habits, which are determined by the controller by monitoring programming displayed on the digital television system over a predetermined

period of time. By virtue of this feature of the invention, it is possible to automate the profile generation process and to provide a more accurate user profile than might otherwise be available.

In particularly preferred embodiments of the invention, the digital television system includes an audio decoder which receives audio data corresponding to the at least two alternative images, and which decodes selected portions of the audio data for output along with the selected one of the alternative images. By virtue of these features of the invention, selected audio data corresponding to the selected video image may also be output via the digital television system.

According to another aspect, the present invention is a method, for use in a digital television system, of locally superimposing images in a video sequence. The method includes storing, in a memory of the digital television system, a user profile containing information relating to a user of the digital television system, and receiving video data defining the video sequence and video data including at least two alternative images for display within the video sequence. In addition, the method includes selecting one of the alternative images based on the information in the user profile, and displaying the video sequence together with the one of the alternative images selected in the selecting step.

According to still another aspect, the present invention is digital television system that includes a transmitter which transmits coded data, where the coded data comprises video data for a video sequence and video data which includes at least two alternative images for display within the video sequence. A digital television stores a user profile comprising information on a user of the digital television, decodes the coded data received from the transmitter, and selects one of the alternative images for display within the video sequence based on the user profile.

By selecting an image based on a user profile, it is possible, among other things, to advertise to a narrow or specific group of consumers or to consumers located in a particular geographic area, to tailor advertising for display at different times of the day, and to synchronize commercials with products shown during a television program.

According to still another embodiment, the present invention is a transmitter for transmitting video data from a centralized location to one or more digital television systems. The video data (i) defines a video sequence for display on a digital television, (ii) includes at least two alternative images for display within the video sequence, and (iii) includes additional information associated with each alternative image. In this embodiment of the invention, the

additional information associated with each alternative image corresponds to information stored in a user profile of the digital television.

This brief summary has been provided so that the nature of the invention may be understood quickly. A more complete understanding of the invention can be obtained by reference to the following detailed description of the preferred embodiments thereof in connection with the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a digital television system in which the present invention may be implemented.

Figure 2 shows a block diagram of the digital television shown in Figure 1.

Figure 3 is a flow diagram depicting operation of the digital television of Figure 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows an example of a television transmission system in which the present invention may be implemented. As shown in Figure 1, television system 1 includes digital television 2, transmitter 4, and transmission medium 5. Transmission medium 5 may be a coaxial cable, fiber-optic cable, or the like, over which video and audio data may be transmitted between transmitter 4 and digital television 2. As shown in Figure 1, transmission medium 5 may include a radio frequency (hereinafter "RF") link, or the like, between portions thereof. In addition, data may be transmitted between transmitter 4 and digital television 2 solely via an RF link, such as RF link 6.

Transmitter 4 is located at a centralized facility, such as a television station or studio, from which the video and audio data may be transmitted to users' digital televisions. In preferred embodiments of the invention, this video and audio data is coded, preferably at the centralized facility, prior to transmission. A preferred coding method for the audio data is AC3 coding. A preferred coding method for the video data is Motion Picture Experts Group (hereinafter "MPEG") coding, and in particular MPEG-2 coding. It should be noted, however, that the invention can be implemented using other coding methods, such as DVB or the like.

The video data comprises a video sequence, which may include one or more television programs and television advertising (i.e., commercials) interspersed among the television programs, while the audio data comprises sound associated with corresponding portions of the video data. In accordance with the invention, the data transmitted from

transmitter 4 also includes synchronized video signals comprising at least two (i.e., two or more) alternative images which may be selected for display on digital television 2, together with corresponding audio data, if any. In preferred embodiments of the invention, identification data is transmitted together with each of the alternative images (and audio data) so as to identify the images as such, together with other information that is used during the image selection process described below.

The alternative images described above comprise alternate portions of the same video sequence. For example, the alternative images may comprise two different commercials for display at the same time in different cities, e.g., one commercial directed to Chicago viewers and one commercial directed to New York viewers. On the other hand, the alternative images may comprise different objects for display within a video sequence. In this regard, television advertisers often advertise their products subliminally using "product placement", meaning placement of products actually within a television program (e.g., placing an American Express® logo on a billboard during an episode of "Seinfeld") as opposed to within a commercial displayed between portions of the television program (e.g., placing an American Express® commercial between portions of an episode of "Seinfeld"). This product placement strategy may be enhanced by the present invention in that the alternative images noted above may comprise images of different products, e.g., different billboard signs, can labels, etc. which can actually be displayed within a television program. Moreover, the invention makes it possible to synchronize product placement with corresponding television commercials, thereby providing for more effective advertising. Which of the alternative images (and corresponding audio data, if any) is actually displayed is selected "locally" by digital television 2 in the manner described below.

Figure 2 shows a block diagram of digital television 2. As shown in the figure, digital television 2 includes tuner 7, VSB demodulator 9, demultiplexer 10, video decoder 11, display processor 12, display screen 14, audio decoder 15, amplifier 16, speakers 17, central processing unit (hereinafter "CPU") 19, modem 20, random access memory (hereinafter "RAM") 21, non-volatile storage 22, read-only memory (hereinafter "ROM") 24, and input devices 25. Each of these features of digital television 2 is well-known to those of ordinary skill in the art; however, descriptions thereof are nevertheless provided herein for the sake of completeness.

In this regard, tuner 7 comprises a standard analog RF receiving device which is capable of receiving an analog signal that includes the video and audio data described above. Specifically, tuner 7 receives this signal from either transmission medium 5 or via RF link 6

over a particular frequency channel. Which channel tuner 7 receives the signal on is dependent upon control data received from CPU 19. This control data is based on data input via one or more of input devices 25. In this regard, input devices 25 can comprise any type of well-known television input device, such as a remote control, keyboard, knob, joystick, etc.

5 Demodulator 9 receives the input analog signal from tuner 7 and, based on control signals received from CPU 19, converts the analog signal into digital data packets. These data packets are then output to demultiplexer 10, preferably at a high speed, such as 20 megabits per second. Demultiplexer 10 receives the data packets output from demodulator 9 and "desamples" the data packets, meaning that the packets are output either to video decoder
10 11, audio decoder 15, or CPU 19 depending upon an identified type of the packet. Specifically, CPU 19 identifies whether data packets from demultiplexer 10 include video data, audio data, or "alternative image" video data based on identification data stored in those packets, and causes the data packets to be output accordingly. That is, video data packets are output to video decoder 11, audio data packets are output to audio decoder 15, and alternative
15 image data packets (i.e., data packets containing video data for the alternative images described above) are output to CPU 19.

 In an alternative embodiment of the invention, the data packets are output from demodulator 9 directly to CPU 19. In this embodiment, CPU 19 performs the tasks of demultiplexer 10, thereby eliminating the need for demultiplexer 10. Specifically, in this
20 embodiment, CPU 19, receives the data packets, desamples the data packets, and then outputs the data packets based on the type of data stored therein. That is, as was the case above, video data packets are output to video decoder 11 and audio data packets are output to audio decoder 15. In this embodiment, however, CPU 19 retains alternative image data packets, rather than outputting those packets.

25 Video decoder 11 decodes video data packets received from demultiplexer 10 (or from CPU 19) in accordance with control signals, such as timing signals and the like, received from CPU 19. In preferred embodiments of the invention video decoder 11 is an MPEG-2 decoder; however, any decoder may be used so long as the decoder is compatible with the type of coding used to code the video data. Decoded video data is then transmitted to
30 display processor 12.

 Display processor 12 can comprise a microprocessor, microcontroller, or the like, which is capable of forming images from video data and of outputting those images to display screen 14. In operation, display processor 12 outputs a video sequence in accordance with control signals received from CPU 19 based on the decoded video data received from

video decoder 11 and based on graphics data received from CPU 19. More specifically, display processor 12 forms images from the decoded video data received from video decoder 11 and from the graphics data received from CPU 19, and inserts the images formed from the graphics data at appropriate points in the video sequence defined by the images formed from the decoded video data. With regard to the graphics data, display processor 12 uses image attributes, chroma-keying methods and region-object substituting methods in order to include (i.e., to superimpose) the graphics data in the data stream for the video sequence.

The graphics data output by CPU 19 may correspond to any number of different types of images, such as station logos or the like. In the context of the present invention, however, these images include at least one of the alternative images transmitted to CPU 19 in the alternative image data packets. That is, as described in more detail below, CPU 19 selects one of the alternative images and then transmits the selected image to display processor 12, together with control data including information as to when and where the selected image is to be displayed within a video sequence. This control data includes, but is not limited to, screen placement coordinates (e.g., where on a display screen the image is to be displayed), scaling and timing information for the image (e.g., the size of the image and times at which the image is to be displayed), and presentation attributes (e.g., image color). In preferred embodiments of the invention, such control data is included in the data packet for each alternative image, and is merely transmitted by CPU 19 to display processor 12 following selection of an alternative image by CPU 19.

Audio decoder 15 is used to decode audio data packets associated with video data (including alternative images) displayed on display screen 14. In preferred embodiments of the invention, audio decoder 15 comprises an AC3 audio decoder; however, other types of audio decoders may be used in conjunction with the present invention depending, of course, on the type of coding used to code the audio data. As shown in Figure 2, audio decoder 15 operates in accordance with audio control signals received from CPU 19. These audio control signals include timing information and the like, and may include information for selectively outputting the audio data, as described in more detail below. Output from audio decoder 15 is provided to amplifier 16. Amplifier 16 comprises a conventional audio amplifier which adjusts an output audio signal in accordance with audio control signals relating to volume or the like input via input devices 25. Audio signals adjusted in this manner are then output via speakers 17.

CPU 19 comprises one or more microprocessors, which are capable of executing stored program instructions (i.e., process steps) to control operations of digital

television 2. These program instructions comprise parts of software modules (described below) which are stored in either an internal memory of CPU 19 or in ROM 24, and which are executed out of RAM 21. These software modules may be updated via modem 20 and/or via the MPEG-2 bitstream. That is, CPU 19 receives data from modem 20, and/or via the MPEG-2, bitstream which may include, but is not limited to, software module updates, video data (e.g., graphics data or the like), audio data, and a user profile. A user profile comprises information relating to one or more viewers of digital television 2, and is used in the method for selecting one of the alternative images described below. The user profile may be stored anywhere within digital television 2, but in preferred embodiments of the invention the user profile is stored in non-volatile storage 22. In this regard, non-volatile storage 22 may comprise a flash EPROM, NVRAM, or the like, which is capable of being reprogrammed with, e.g., a new user profile, as desired.

At this point, it is noted that the invention may be implemented either (i) in a digital television system, such as that shown in Figure 2, in which all control hardware is housed within the digital television 2, or (ii) in a digital television system which includes both a digital television and a settop box. In the latter case, CPU 19 above, or its substantial equivalent, may be housed in the settop box, together with a memory that includes software modules executed thereby. In this case, the digital television is controlled based on control signals from the settop box, and will itself include one or more processors, such as display processor 12 described above, for performing necessary control functions as well as video and audio display functions. Thus, although the invention can be implemented using different hardware configurations, for the sake of brevity, the following assumes that the hardware and software resides in the digital television itself.

Figure 2 shows examples of software modules which are executable within CPU 19. As shown in Figure 2, these modules include control module 27, user interface module 29, application modules 30, and operating system module 31. Operating system module 31 controls execution of the various software modules running in CPU 19 and supports communication between these software modules. Operating system module 31 may also control data transfers between CPU 19 and various other components of digital television 2, such as ROM 24. User interface module 29 receives and processes data received from input devices 25, and causes CPU 19 to output control signals in accordance therewith. To this end, CPU 19 includes control module 27, which outputs such control signals together with other control signals, such as those described above, for controlling operation of the various components of digital television 2. CPU 19 may also execute software modules (not shown)

to decode video and audio data received from the transmitter. In the case that CPU 19 has this capability, demultiplexer 10 provides the video and audio data packets noted above to CPU 19 which performs the functions of video decoder 11 and audio decoder 15. In this case, video decoder 11 and audio decoder 15 can be removed from the invention.

5 Application modules 30 comprise software modules for implementing various signal processing features available on digital television 2. Application modules 30 can include both manufacturer-installed, i.e., "built-in", applications and applications which are downloaded via modem 20 or, alternatively, in the video data stream. Examples of well-known applications that may be included in digital television 2 are an electronic program
10 guide ("ECG") module and a closed-captioning ("CC") module.

 In the present invention, application modules 30 also includes editing module 32, which may be either a built-in or downloaded software module. In brief, editing module 32 receives or compiles a user profile for digital television 2, stores that profile in a memory such as non-volatile storage 22, selects one of the alternative images provided to CPU 19 by
15 demultiplexer 10, and causes display processor 12 to display the selected alternative image within a video sequence (e.g., a television program) output to display screen 14. Editing module 32 also controls the output of audio information, if any, that corresponds to the selected alternative image.

 Figure 3 shows, in detail, processing performed by editing module 32. More
20 specifically, in step S301, editing module 32 determines a user profile for digital television 2. In this regard, as noted above, the user profile comprises information specific to digital television 2 which is used in the selection of one of the alternative images. Information in the user profile may include a user's television viewing habits, such as which television programs that the user watches regularly, times of day that the user watches television, and commercials
25 "zapped" (i.e., switched off); generic information, such as the user's zip code, telephone area code, neighborhood, and country; and user demographic information, such as the users' age, sex, yearly income, personal preferences, and personal habits. Any combination of the foregoing or any other relevant information may also be included within a user profile.

 In some embodiments of the invention, different user profiles may be included
30 in the digital television for different viewers. In these embodiments, the appropriate user profile may be selected by, e.g., inputting a code corresponding to a particular viewer when digital television 2 is turned on. For simplicity's sake, however, the invention described herein will assume one user profile for digital television 2.

In the present invention, the user profile may be determined in one or more different ways. For example, a viewer may fill out an on-screen questionnaire using an input device. The user profile may then be based upon the answers provided in the questionnaire. Alternatively, the user profile may be determined at an external location, i.e., outside of digital television 2, and then downloaded to digital television 2 via modem 20. As still another alternative, digital television 2 may itself compile the user profile. Specifically, CPU 19 may do this by monitoring programming displayed on digital television 2 over a predetermined period of time (e.g., one month) and, based thereon, determine a users' viewing habits, preferences, etc. Such information may then be stored as the user profile for digital television 2. Combinations of the foregoing methods may also be used to determine the user profile. For example, a user may manually edit a profile determined automatically by CPU 19; the user may request that the television "fill in" missing answers of a questionnaire; etc.

Following step S301, processing proceeds to step S302, in which the user profile is stored in a memory, such as non-volatile storage 22. Thereafter, step S303 receives, from demultiplexer 10, data packets containing alternative images for display within a video sequence, and decodes video data in these packets if necessary. Next, step S304 selects one of the alternative images for display based on information in the user profile and based on information in the data packet corresponding to the selected image. More specifically, the data packets received in step S304 containing alternative images also contain information which can be correlated to parameters in the user's profile. Step S304 therefore decomposes received data packets in order to obtain this information, and selects an alternative image in a data packet that has information which correlates to parameters in the user's profile.

By way of example, in the case of a soccer game being transmitted throughout Europe, data packets containing alternative advertising for each country may be included in the video data stream. Each such data packet may include information specifying the country in which an image stored in that packet is to be displayed. Similarly, digital televisions in each country may include a user profile specifying in which country the television is located. Thus, for a television in Germany, for example, step S304 will review that television's user profile and will determine that the digital television is located in Germany. Then, upon receiving the data packets containing alternative advertising, step S304 will decompose each received data packet in order to determine which of the data packets contains information specifying Germany. Once this has been determined, step S304 selects the image in the data packet containing information specifying Germany and disregards all other data packets.

A process similar to that described in the example above may be used to select images based, e.g., on user demographics data, personal preferences, habits, etc. For example, a data stream for a sporting event may include data packets containing alternative images which include "preference" information corresponding to preferred teams. Such packets will
5 then be received in step S304, decomposed, and this preference information compared with parameters in the user profile in order to select one of the alternative images for display during the sporting event. Similar processes may be used to make the selection based on age, gender, etc. In addition, combinations of features may be used in the selection process. For example, data packets containing alternative images may include information indicating that particular
10 images are preferred by males ages 18 to 49. In this case, step S304 will compare this information to both gender and age parameters in a user profile in order to determine if that image, or another image, should be selected.

In preferred embodiments of the invention, a default data packet containing a default image is also provided to CPU 19. In these embodiments, this packet is selected in a
15 case that information in data packets including other images does not match any parameters in a user profile.

Once step S304 selects an image, processing proceeds to step S305. Step S305 determines if there is any audio information associated with the selected image. For example, in the case that the selected image is an image used in product placement, it is unlikely that
20 there is corresponding audio information associated with the selected image. Accordingly, in such a case, processing proceeds to step S306. In step S306, the selected image is output to display processor 12, together with information concerning how and when in a video sequence the selected image is to be displayed. Thereafter, display processor 12 superimposes data for the selected image in the data stream and displays the video sequence, including the selected
25 image, on display screen 14.

On the other hand, in the case that the selected image corresponds to a television commercial, it is likely that there is audio data associated with the selected image. In this case, therefore, processing proceeds to step S307. Step S307 selects portions of audio data which corresponds to the selected image. Thereafter, processing proceeds to step S306,
30 in which the selected image is output as described above, and in which the selected portions of the audio data are then controlled by CPU 19 to be output in sequence with the corresponding selected image. In this regard, it is noted that audio data corresponding to selected images may be contained within data packets for those images and then output by CPU 19 to audio decoder 15 or to audio amplifier 16 depending upon whether the audio data is coded.

Alternatively, data packets containing such audio data may be provided to audio decoder 15 directly from demultiplexer 10, and then selected by CPU 19 based on which of the alternative images have been selected. Following step S306, processing ends.

Thus, revisiting the "soccer game" example provided above, using the present invention it is possible for viewers in Germany to watch, e.g., a beer commercial in German, while viewers in Italy, at the same point in the soccer game, are watching a pasta commercial in Italian. Similarly, during an episode of a sitcom, if there is a cereal box on a table, using the invention it is possible to change the logo on the cereal box to match the tastes of the people watching television, e.g., to change the logo from Lucky Charms® to Special K® or vice versa. Given the foregoing, using the invention it is also possible to synchronize product placement and television commercials, thereby providing for more effective advertising.

Of course, those of ordinary skill in the art will recognize that the invention described herein is not limited to inserting advertising into television programs, and that the invention may be used in conjunction with inserting any graphics images within a video sequence in the manner described above. In this regard, the invention may be used in connection with selection of entertainment or educational programming based on information stored in the user profile. For example, in accordance with the invention, different television programs may be transmitted in different languages. Using the invention, it is possible to select a television program appropriate for a user of a digital television based on the user profile. Similarly, the invention can be used in schools, or even in the home, to select educational television programming (e.g., one of several alternative television images) in accordance with information stored in the user profile.

The present invention has been described with respect to a particular illustrative embodiment. It is to be understood that the invention is not limited to the above-described embodiment and modifications thereto, and that various changes and modifications may be made by those of ordinary skill in the art without departing from the spirit and scope of the appended claims.

Claims:

1. A digital television system (2) comprising:
a memory (22, 24) which stores a user profile and computer-executable process steps;
a display processor (12) which receives video data, and which outputs the video data as a video sequence; and
a controller (19) which receives video data corresponding to at least two alternative images, and which executes the process steps stored in the memory so as (i) to select one of the alternative images based on information stored in the user profile, and (ii) to cause the display processor to include the selected one of the alternative images within the video sequence.
2. A digital television system according to Claim 1, wherein the information stored in the user profile is based on television viewing habits of a user of a digital television (2).
3. A digital television system according to Claim 2, wherein the television viewing habits of the user are predetermined and then information corresponding thereto is stored in the user profile.
4. A digital television system according to Claim 2 or 3, wherein the controller (19) determines the television viewing habits of the user by monitoring programming displayed on the digital television (2) over a predetermined period of time.
5. A digital television system according to anyone of Claims 1 to 4, wherein the user profile is based on user demographic information.
6. A digital television system according to anyone of Claims 1 to 5, wherein the alternative images comprise images of objects in the video sequence.

7. A digital television system according to anyone of Claims 1 to 5, wherein the alternative images comprise portions of the video sequence.
8. A digital television system according to Claim 7, wherein the video sequence
5 comprises television programs and television advertisements, and wherein the portions of the video sequence comprise the television advertisements between the television programs.
9. A digital television system according to anyone of Claim 1 to 8, further
10 comprising an audio decoder (15) which receives audio data corresponding to the at least two alternative images, and which decodes selected portions of the audio data for output along with the selected one of the alternative images.
10. A digital television system according to anyone of Claims 1 to 9, wherein the
15 memory (22, 24), display processor (12) and controller (19) are housed within a digital television (2).
11. A digital television system according to anyone of Claims 1 to 9, wherein the
20 controller (19) and the memory (22, 24) are housed within a settop box and the display processor is housed within a digital television (2).
12. A method, for use in a digital television system (2), of locally superimposing
images in a video sequence, the method comprising the steps of:
storing (S302), in a memory of the digital television system (2), a user profile
containing information relating to a user of a digital television (2);
25 receiving (S303) video data defining the video sequence and video data
including at least two alternative images for display within the video sequence;
selecting (S304) one of the alternative images based on the information in the
user profile; and
displaying (S306) the video sequence together with the one of the alternative
30 images selected in the selecting step (S304).
13. A digital television system comprising:

a transmitter (4) which transmits coded data, the coded data comprising video data for a video sequence and video data which includes at least two alternative images for display within the video sequence; and

5 a digital television (2) which stores a user profile comprising information on a user of the digital television, which decodes the coded data received from the transmitter, and which selects one of the alternative images for display within the video sequence based on the user profile.

14. A digital television system according to Claim 13, wherein the coded data
10 transmitted by the transmitter (4) further comprises audio data corresponding to the at least two alternative images; and

wherein the digital television (2) further comprises an audio decoder (15) which decodes selected portions of the audio data for output along with the selected one of the alternative images.

15

15. A transmitter (4) for transmitting video data from a centralized location to one or more digital television systems (2), the video data (i) defining a video sequence for display on a digital television (2), (ii) including at least two alternative images for display within the video sequence, and (iii) including additional information associated with each alternative
20 image, the additional information associated with each alternative image corresponding to information stored in a user profile of the digital television (2).

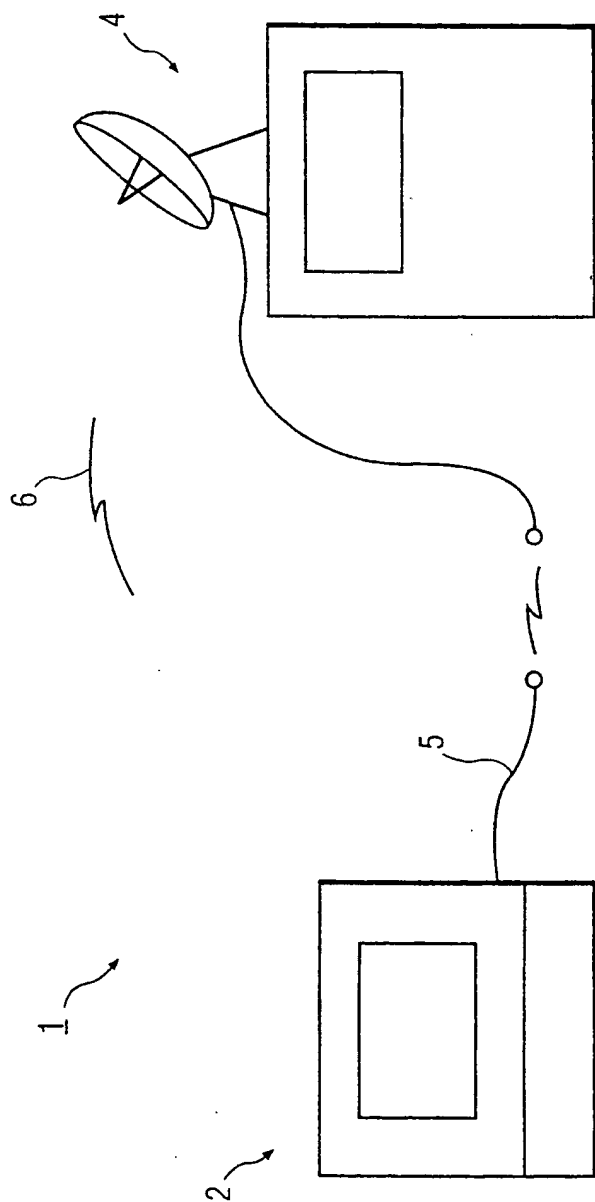


FIG. 1

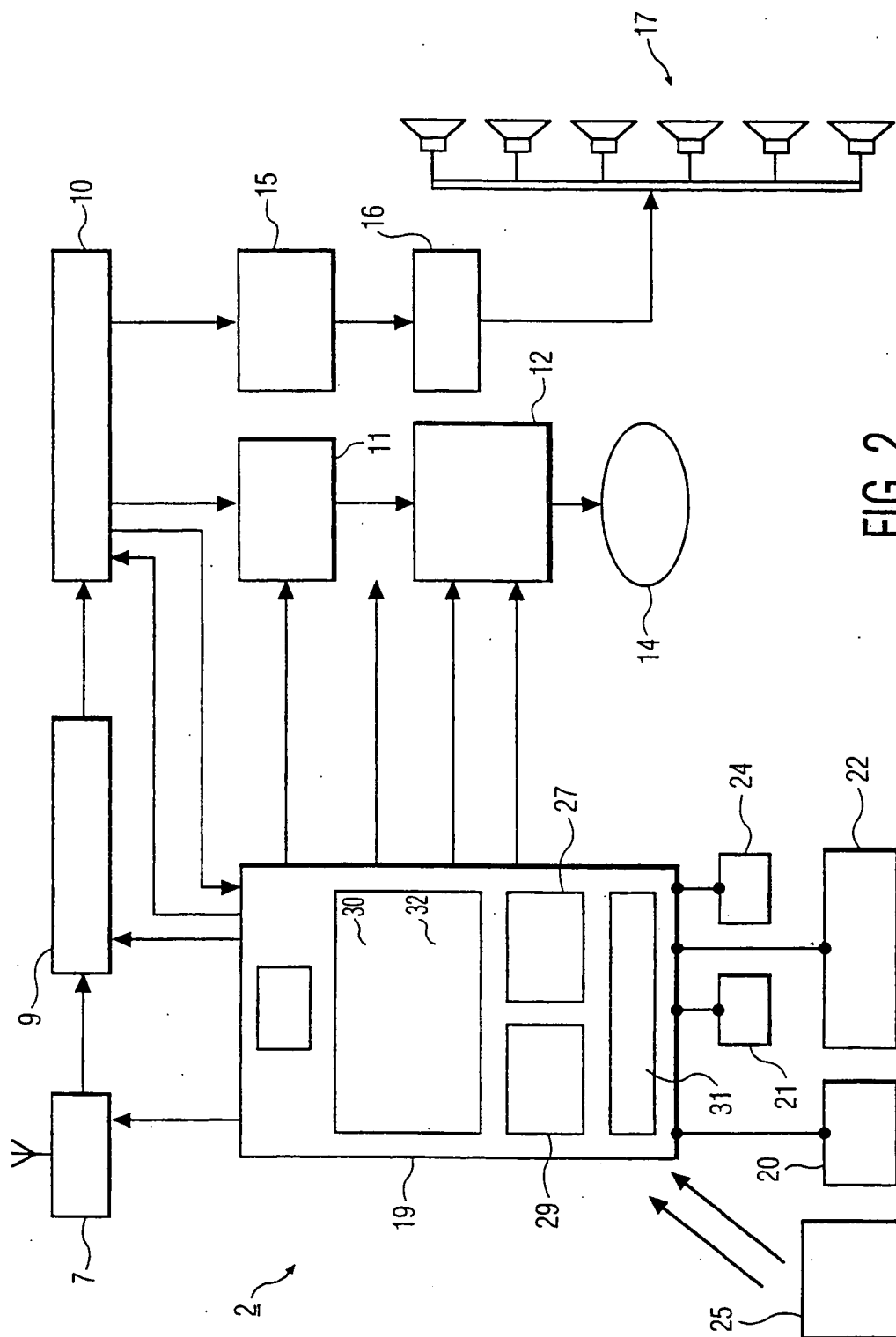


FIG. 2

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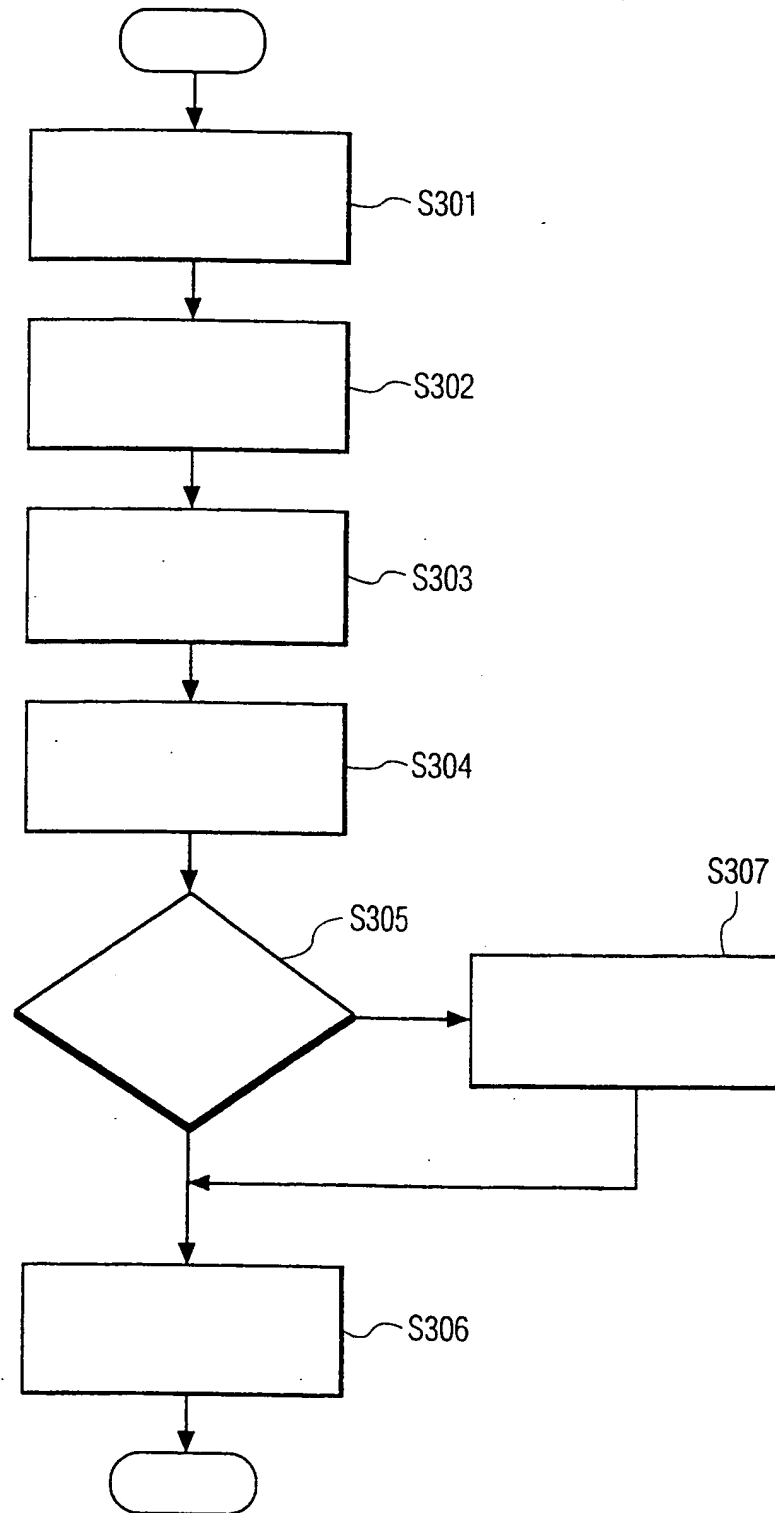


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 99/00261

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: H04N 7/173 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC6: H04N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5027400 A (TORU BAJI ET AL), 25 June 1991 (25.06.91), abstract --	1-15
A	International Conference on Information and Knowledge Management, Volume, 1996, (Rockville), Michael Ehrmantraut, "The Personal Electronic Program Guide - Towards the Pre-selection of Individual TV Programs", see whole document --	1-15
A	US 5424770 A (RICHARD A. SCHMELZER ET AL), 13 June 1995 (13.06.95), abstract --	1-15
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
8 Sept. 1999		13 -09- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer Bengt Romedahl/MN Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 99/00261

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9528794 A2 (PHILIPS ELECTRONICS N.V.), 26 October 1995 (26.10.95), abstract -----	1-15

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INTERNATIONAL SEARCH REPORT
Information on patent family members

02/08/99

International application No.

PCT/IB 99/00261

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5027400 A	25/06/91	CA 1322590 A	28/09/93
		DE 68921943 D,T	26/10/95
		EP 0355697 A,B	28/02/90
		JP 2054646 A	23/02/90

US 5424770 A	13/06/95	CA 2121151 A	17/10/94
		EP 0620689 A	19/10/94
		US 5365263 A	15/11/94

WO 9528794 A2	26/10/95	AU 686355 B	05/02/98
		AU 700272 B	24/12/98
		AU 2082195 A	10/11/95
		AU 2082295 A	10/11/95
		BR 9507363 A	18/11/97
		CA 2187796 A	26/10/95
		CN 1149950 A	14/05/97
		CN 1149953 A	14/05/97
		EP 0755604 A	29/01/97
		EP 0775413 A	28/05/97
		JP 9512147 T	02/12/97
		JP 9512148 T	02/12/97
		US 5633683 A	27/05/97
		WO 9528795 A	26/10/95

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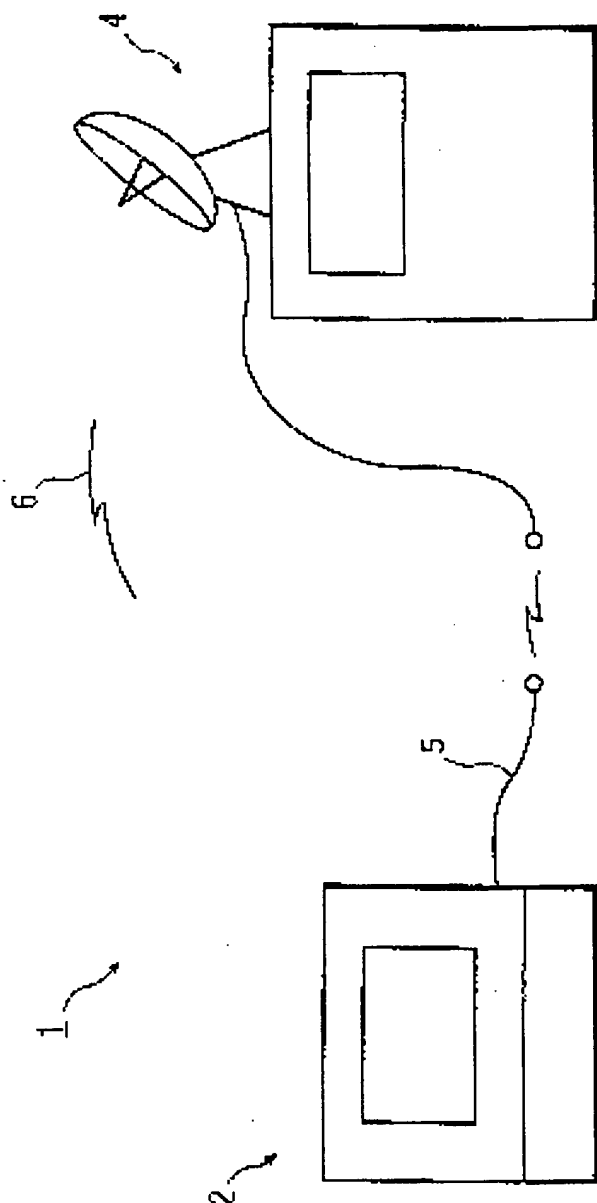


FIG. 1

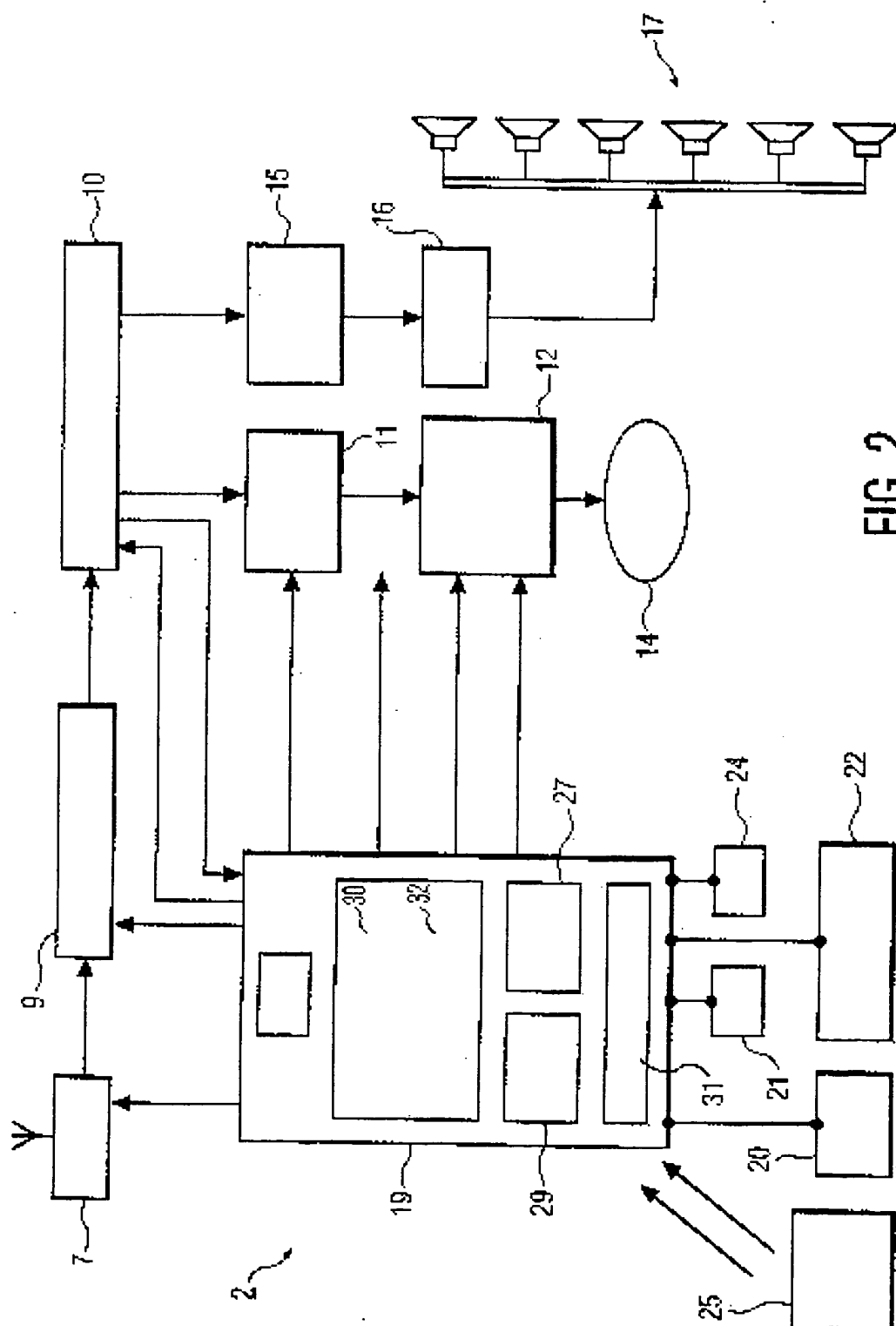


FIG. 2

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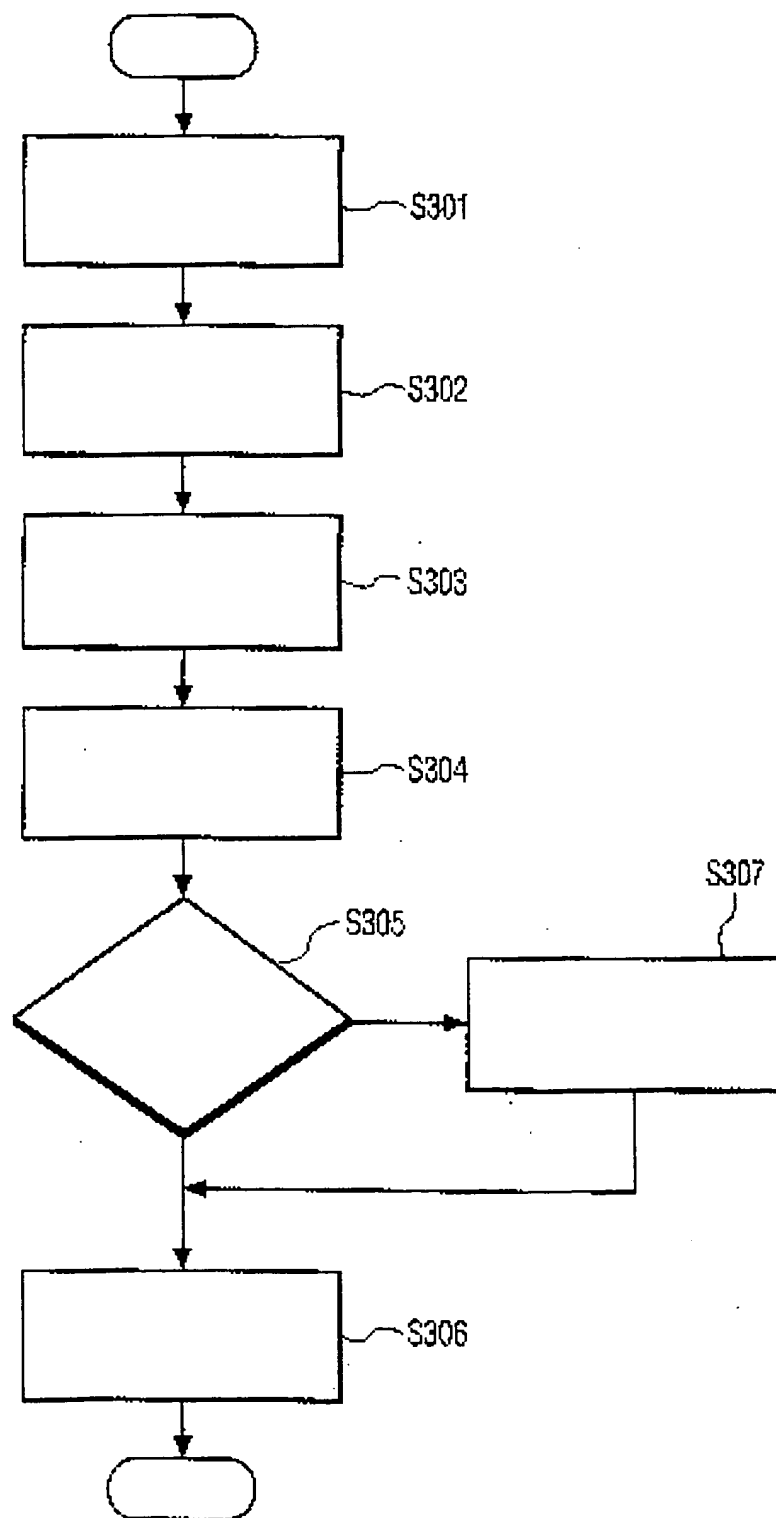


FIG. 3

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